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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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KONRAD RAYNES & VICTOR, LLP
Suite 210
315 S. Beverly Drive
Beverly Hills, CA 90212

EXAMINER

CHOI, WOO H

ART UNIT PAPER NUMBER

2189

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/822,410	Applicant(s) DAY ET AL.	
	Examiner Woo H. Choi	Art Unit 2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

~~See the~~ * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/22/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 17 – 24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 17 claims “an article of manufacture”.

Applicant’s definition of “an article of manufacture” seems to include transmission media (specification, page 9, paragraph 21), which the Office currently regards as non-statutory. See Interim Guidelines for Examination of Patent Applications, Annex IV (c), pages 55 – 57 (http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf). A device implementing code is not necessarily limited to a hardware device. A claim directed to a computer-readable medium comprising computer executable code that performs recited operations when executed would overcome this rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recite limitations that belong in two different statutory categories (a computer readable medium which is a product, and a hardware device which seems to be a

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machine) in the alternative in a way that changes the statutory category of the claim depending on which option is chosen. It is not clear in which statutory category this claim is intended to be.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, 9 – 16, 17, 19, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Krishnaiyer et al. (US Patent Application Publication No. 2004/0123041).

6. With respect to claims 9 – 16, Krishnaiyer et al. disclose a system (figure 4), comprising:
a cache (18);
storage (12); and
circuitry (14 and 16) **capable** of performing operations (a general purpose processor, such as the one shown in figure 4, is inherently capable of performing any operation it is programmed to perform including the operations recited in this and dependent claims, see also paragraphs 24 - 28).

7. With respect to claims 1, 2, 9, 10, 17, 19, and 25, see paragraphs 24 – 29 and figure 3.

The conditional statement in paragraph 24 indicates that the content of the request is a prefetch memory I/O request. Krishnaiyer also discloses processing a prefetch command in figure 3 where if the content of the I/O requests exhibits predictable access pattern, prefetch instructions are inserted and executed. A condition that data be prefetched if data is to be prefetched is satisfied when the requested prefetch I/O is performed at its requested address.

8. Claims 1, 9, 17, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikeuchi et al (US Patent Application Publication No. 2004/0230742, hereinafter "Ikeuchi").

Ikeuchi discloses a method (figure 21), comprising:

processing a prefetch command (see figure 4) indicating at least one conditional statement indicating a condition with respect to content of a received Input/Output request (S100, S102, processing of prefetch command indicates that the content of the received I/O request is a prefetch request as opposed to a host I/O command) and at least one block to prefetch (S104, S106) from storage to cache (see figure 18) in response to determining that the conditional statement is satisfied.

9. Claims 1 – 24 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Lange et al (US Patent Application Publication No. 2005/0198439, hereinafter "Lange").

10. With respect to claims 1, 2, 9, 10, 17, 18, and 25, Lange discloses a method (figure 5) comprising:

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processing a prefetch command indicating at least one conditional statement (540, 550, and 560, form a typical if <condition> then <do A> else <do B> conditional statement) indicating a condition with respect to content of a received I/O request (540, cache miss indicates a condition that the content or the target of the I/O request is not in cache) and at least one block (blocks fetched at 550 and 560) to prefetch from storage to cache in response to determining that the conditional statement is satisfied,

wherein the conditional statement indicates a block that when accessed causes the prefetching of the at least one block to prefetch indicated in the conditional statement, wherein processing the prefetch command comprises:

generating the prefetch command using predictive analysis techniques to determine blocks anticipated to be accessed if a specified block is accessed, wherein the conditional statements specifies to prefetch the at least one block anticipated to be accessed if the specified block is accessed (see figures 5, 6 and paragraphs 64 – 66, cache miss/hit determination step predicts the direction of anticipated access).

The condition that the target of the I/O request is not in cache indicates a target block that when accessed causes prefetching as shown in figure 5 step 550.

11. With respect to claims 3, 4, 6, 11, 12, 14, 19, 20 and 22, wherein one conditional statements is satisfied if an Input/Output request is directed to a specified block in the conditional statement (paragraph 64, cache hit condition is satisfied if an I/O request to memory is directed to a block in cache; see also figure 5, the conditional statement is satisfied when a prefetch I/O requests in steps 550 or 560 are directed to their respective target addresses),

wherein processing the prefetch command comprises generating the prefetch command, further comprising:

transmitting the generated prefetch command to a storage controller (figure 6); and
transmitting Input/Output (I/O) requests to the storage controller after transmitting the generated prefetch command, wherein the storage controller prefetches the at least one block to prefetch indicated in one prefetch command in response to determining that the I/O request is directed to the specified block in the conditional statement of one prefetch command (figure 5, paragraph 42, cache hit, which continues previous prefetch command, is a result of an I/O request directed to a block in cache, i.e., specified in hit/miss conditional statement of 540, which was likely to have been prefetched as a result of a prefetch command transmitted prior to the I/O request).

12. With respect to claims 5, 13 and 21, processing the prefetch command further comprises:
including a duration parameter in the prefetch command indicating a duration of the prefetch command (paragraphs 44 and 64, duration parameter is implicit, duration for a single page prefetcher is one page, and for a multi-page prefetcher is the number of pages the prefetcher is designed to handle, or until the buffer is full).

13. With respect to claims 7, 15 and 23, see figure 5, 540 and 560. Prefetch does not expire if there's a cache hit.

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14. With respect to claims 8, 16 and 24, one conditional statement includes a plurality of branch conditions (540, 640, Y/N branches for both), wherein each branch condition indicates one block (540 indicates 550 and 560, and 640 indicates 620 or any of the other blocks since reaching 640 indicates that blocks 600 – 630 must have been visited) and is associated with at least one block to prefetch (630), further comprising:

prefetching all blocks to prefetch associated with the branch conditions in the conditional statement (see figure 6); and

removing blocks to prefetch from cache associated with branch conditions that are not satisfied in response to determining that the block indicated in one branch condition is accessed (see paragraphs 43 and 64, if the prefetched data, for example, data previously retrieved in block 560, is not required, it is replaced with newly prefetched data by the alternate branch 550).

Response to Amendment

15. Claim 17 has been amended to overcome rejections under 35 USC 101 and 112, second paragraphs. Rejections under 112, second paragraph has been withdrawn. Rejections under 101 are maintained as discussed above.

Response to Arguments

16. Applicant's arguments filed September 22, 2006, have been fully considered but they are not persuasive.

Applicant's argument that "the article of manufacture" may comprise statutory subject matter misses the point. If Applicant's definition of a claimed subject matter is broad enough to

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encompass or capture non-statutory subject matter, it is subject to rejections under 35 U.S.C.

101.

Applicant's arguments regarding rejections based on Krishnaiyer and Ikeuchi are address above. Similarly, arguments regarding rejections of claims 1 – 3, 6 and other similar claims based on Lange are addressed in the rejections above.

As to claim 6, the Examiner agrees that an implicit disclosure is not an explicit disclosure. Nevertheless, prior art can anticipate a claim explicitly, implicitly or inherently.

As to Applicant's argument regarding Lange not disclosing expiration of a prefetch command, the claim does not require that a prefetch command expire. The claim merely requires that the target block satisfy the conditional statement of one unexpired prefetch command. The conditional statement disclosed in figure 5 (steps 540, 550 and 560), that either begins a new prefetch or continues the previous prefetch, determines whether the target block is (or is not) in the cache.

As to claim 8, the Examiner disagrees that Lange does not disclose removing prefetched data associated with conditions of prefetch command that are not satisfied. When there is a cache miss data associated with previous prefetch (unexecuted branch of the conditional statement, or condition not satisfied) that are already in cache replaced with newly prefetched data.

Conclusion

17. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Woo H. Choi whose telephone number is (571) 272-4179. The examiner can normally be reached on M-F, 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald Bragdon can be reached on (571) 272-4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Woo H. Choi
November 9, 2006